1996, and has so served within five years of the date of application; or

(b) Certificates of Discharge proving at least 30 days of service as chief, first assistant, or cargo engineer on tankships certified to carry DL or LG, appropriate to the endorsement applied for before March 31, 1996, with a discharge date within five years of the date of application.

### § 13.117 Any person: Endorsement as Tankerman-Assistant based on unlicensed deck service before March 31, 1996.

A person with unlicensed deck service on tankships before March 31, 1996, may, at any time until the first renewal of his or her MMD under § 12.02–27 of this chapter that occurs after March 31, 1997, apply for a ''Tankerman-Assistant'' endorsement under this subpart if the applicant presents either—

(a) A letter on company letterhead from the owner, operator, or master of the vessel attesting that the applicant served at least 30 days of deck service on tankships certified to carry DL or LG, appropriate to the endorsement applied for before March 31, 1996, and has so served within five years of the date of application; or

(b) Certificates of Discharge proving at least 30 days of deck service on tankships certified to carry DL or LG, appropriate to the endorsement applied for before March 31, 1996, with a discharge date within five years of the date of application.

### § 13.119 Expiration of endorsement.

An endorsement as tankerman is valid for the duration of the MMD.

### § 13.120 Renewal of endorsement.

An applicant wishing to renew a tankerman's endorsement shall meet the requirements of § 12.02–27 of this chapter for renewing an MMD and provide evidence of participation in at least two transfers during the past five years in accordance with § 13.127(b) or of completion of an approved course.

### § 13.121 Courses for training tankerman.

(a) This section prescribes the requirements, beyond those in §§ 10.203 and 10.303 of this chapter, applicable to schools offering courses required for a tankerman endorsement and courses that are a substitute for experience with transfers of liquid cargo in bulk required for the endorsement.

(b) Upon satisfactory completion of an approved course, each student shall receive a certificate, signed by the head of the school offering the course or by a designated representative, indicating the title of the course, the duration, and, if appropriate, credit allowed towards meeting the transfer requirements of this part.

(c) A course that uses simulated transfers to train students in loading and discharging tank vessels may replace a specific number of the transfers required for a ''Tankerman-PIC'' or ''Tankerman-PIC (Barge)'' endorsement. The letter from the Coast Guard approving the course will state the number and kind of transfers the course replaces.

(d) The course in liquid cargo required for an endorsement as—

(1) ''Tankerman-PIC DL'' is Tankship: Dangerous Liquids;

(2) ''Tankerman-PIC (Barge) DL'' is Tank Barge: Dangerous Liquids;

(3) ''Tankerman-PIC LG'' is Tankship: Liquefied Gases; and

(4) ''Tankerman-PIC (Barge) LG'' is Tank Barge: Liquefied Gases.

(e) The course in firefighting required for an endorsement as—

(1) ''Tankerman-PIC (Barge)'' is Tank Barge: Firefighting; and

(2) ''Tankerman-PIC'', ''Tankerman-Assistant'', and ''Tankerman-Engineer'' is a firefighting course that meets the basic firefighting section of the IMO's Resolution A.437 (XI), ''Training of Crews in Fire Fighting''.

(f) No school may issue a certificate unless the student has successfully completed an approved course with the appropriate curriculum outlined in Table 13.121(f).

(g) An organization with a course in DL or LG or a course in tank-barge firefighting taught before March 31, 1996, that substantially covered the material required by Table 13.121(f) for liquid cargoes and by Table 13.121(g) for firefighting may seek approval under § 10.302 of this chapter from the Coast

Guard for any course taught up to ten years before March 31, 1996.

TABLE 13.121(F)

| Course topics | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| General characteristics, compatibility, reaction, firefighting procedures, and safety precautions for the cargoes of: | | | | |
| Bulk liquids defined as Dangerous Liquids in 46 CFR Part 13. | x | x | ..... | |
| Bulk liquefied gases & their vapors defined as Liquefied Gases in 46 CFR Part 13. | ..... | ..... | x | x |
| Physical phenomena of liquefied gas, including: | | | | |
| Basic concept | ..... | ..... | x | x |
| Compression & expansion | ..... | ..... | x | x |
| Mechanism of heat transfer | ..... | ..... | x | x |
| Potential hazards of liquefied gas, including: | | | | |
| Chemical & physical properties | ..... | ..... | x | x |
| Combustion characteristics | ..... | ..... | x | x |
| Results of gas release to the atmosphere | ..... | ..... | x | x |
| Health hazards (skin contact, inhalation, & ingestion) | ..... | ..... | x | x |
| Control of flammability range with inert gas | ..... | ..... | x | x |
| Thermal stress in structure & piping of vessel | ..... | ..... | x | x |
| Cargo systems, including: | | | | |
| Principles of containment systems | x | x | x | x |
| Construction, materials, coatings, & insulation of cargo tanks. | x | x | x | x |
| General arrangement of cargo tanks | x | x | x | x |
| Venting & vapor-control systems | x | x | x | x |
| Cargo-handling systems, including: | | | | |
| Piping systems, valves, pumps, & expansion systems | x | x | x | x |
| Operating characteristics | x | x | x | x |
| Instrumentation systems, including: | | | | |
| Cargo-level indicators | x | x | x | x |
| Gas-detecting systems | x | x | x | x |
| Temperature-monitoring systems, cargo | x | x | x | x |
| Temperature-monitoring systems, hull | x | x | x | x |
| Automatic-shutdown systems | x | x | x | x |
| Auxiliary systems, including: | | | | |
| Ventilation, inerting | x | x | x | x |
| Valves, including: | | | | |
| Quick-closing | x | x | x | x |
| Remote-control | x | x | x | x |
| Pneumatic | x | x | x | x |
| Excess-flow | x | x | x | x |
| Safety-relief | x | x | x | x |
| Pressure-vacuum | x | x | x | x |
| Heating-systems: cofferdams & ballast tanks | | | x | x |
| Operations connected with loading & discharging of cargo, including: | | | | |
| Lining up of cargo system and vapor-control system | x | x | x | x |
| Pre-transfer inspections | x | x | x | x |
| Pre-transfer conference and completion of the Declaration of Inspection. | x | x | x | x |
| Hooking up of cargo hose, loading arms, and grounding-strap. | x | x | x | x |
| Starting of liquid flow | x | x | x | x |
| Calculation of loading rates | x | x | x | x |
| Monitoring of loading rates | x | x | x | x |
| Discussion of loading | x | x | x | x |
| Ballasting & deballasting | x | x | x | x |
| Topping off of cargo tanks | x | x | x | x |
| Discussion of discharging | x | x | x | x |
| Stripping of cargo tanks | x | x | x | x |
| Monitoring of transfers | x | x | x | x |
| Gauging of cargo tanks | x | x | x | x |
| Disconnecting of cargo hoses or loading arms | x | x | x | x |
| Operating procedures & sequence for: | | | | |
| Inerting of cargo tanks & void spaces | x | x | x | x |
| Cooldown & warmup of cargo tanks | | | x | x |
| Gas-freeing | x | x | x | x |
| Loaded or ballasted voyages | x | x | x | x |
| Testing of cargo-tank atmospheres for oxygen & cargo vapor. | x | x | x | x |
| Load plan, stability, & stress connected with: | | | | |
| Loading of cargo | x | x | x | x |

TABLE 13.121(F)—Continued

| Course topics | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Discharging of cargo | x | x | x | x |
| Ballasting & deballasting | x | | x | |
| Loadline, draft, & trim | x | x | x | x |
| Disposal of boil-off, including: | | | | |
| System design | | | x | x |
| Safety features | | | x | x |
| Stability-letter requirements | x | x | x | x |
| Rules (for tank barge & tankship, both international & Federal) pertaining to operational procedures & pollution prevention. | x | x | x | x |
| Pollution prevention, including: | | | | |
| Procedures to prevent air & water pollution | x | x | x | x |
| Measures to take in event of spillage | x | x | x | x |
| Danger from drift of vapor cloud | x | x | x | x |
| Emergency procedures for the following, including notice to appropriate authorities: | | | | |
| Fire | x | x | x | x |
| Collision | x | x | x | x |
| Grounding | x | x | x | x |
| Equipment failure | x | x | x | x |
| Leaks & spills | x | x | x | x |
| Structural failure | x | x | x | x |
| Emergency discharge of cargo | x | x | x | x |
| Entering of cargo tanks | x | x | x | x |
| Emergency shutdown of cargo-handling | x | x | x | x |
| Emergency systems for closing cargo tanks | x | x | x | x |
| Safety precautions relative to: | | | | |
| Dangers of skin contact | x | x | ..... | |
| Inhalation of vapors | x | x | ..... | |
| Electricity & static electricity: hazards & precautions | x | x | ..... | |
| Terminology of tankships for oil & chemicals | x | | ..... | |
| Terminology of tank barges for oil & chemicals | x | x | ..... | |
| Terminology of tankships for liquefied gases | ..... | ..... | x | |
| Terminology of tank barges for liquefied gases | ..... | ..... | x | |
| Principles & procedures of Crude-Oil-Washing (COW) systems, including: | | | | |
| Purpose | x | x | ..... | |
| Equipment & design | x | x | ..... | |
| Operations | x | x | | |
| Safety precautions | x | x | ..... | |
| Maintenance of plant & equipment | x | x | ..... | |
| Principles & procedures of Inert-Gas Systems (IGS), including: | | | | |
| Purpose | x | x | x | |
| Equipment & design | x | x | x | |
| Operations | x | x | x | |
| Safety precautions | x | x | x | |
| Maintenance of plant & equipment | x | x | x | |
| Cargo-tank cleaning: procuredures & precautions. | x | x | ..... | |
| Principles & procedures of vapor-control recovery systems, including: | | | | |
| Purpose | x | x | x | x |
| Principles | x | x | x | x |
| Components | x | x | x | x |
| Hazards | x | x | x | x |
| Coast Guard regulations | x | x | x | x |
| Operating procedures, including: | | | | |
| Testing & inspection requirements | x | x | x | x |
| Pre-transfer procedures | x | x | x | x |
| Connecting sequence | x | x | x | x |
| Start-up procedures | x | x | x | x |
| Normal operations | x | x | x | x |
| Emergency procedures, including notice of release | x | x | x | x |
| Information systems on hazards of cargo | x | x | x | x |
| Safe entry into confined spaces, including: | | | | |
| Definitions & hazards of confined spaces | x | x | x | x |
| Evaluation & assessment of risks & hazards | x | x | x | x |
| Safety precautions & procedures | x | x | x | x |
| Personal protective equipment (PPE) | x | x | x | x |
| Maintenance of PPE | x | x | x | x |
| Emergency procedures | x | x | x | x |
| Federal regulations, national standards, & industry guidelines. | x | x | x | x |

TABLE 13.121(F)—Continued

| Course topics | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Inspections by marine chemists & competent persons, including hot-work permits & procedures. | x | x | x | x |
| Vessel Response Plans: | | | | |
| Purpose, content, & location of information | x | x | x | x |
| Procedures for notice & mitigation of spills | x | x | x | x |
| Geographic-specific appendices | x | x | x | x |
| Vessel-specific appendices | x | x | x | x |
| Emergency-action checklist | x | x | x | x |

(1) Tankerman-PIC DL.
(2) Tankerman-PIC (Barge) DL.
(3) Tankerman-PIC LG.
(4) Tankerman-PIC (Barge) LG.

TABLE 13.121(g)

| Course topics | 1 | 2 |
|---|---|---|
| Elements of fire (Fire triangle): | | |
| Fuel | X | X |
| Source of ignition | X | X |
| Oxygen | X | X |
| Ignition sources (general): | | |
| Chemical | | X |
| Biological | | X |
| Physical | | X |
| Ignition sources applicable to barges | X | |
| Definitions of flammability and combustibility: | | |
| Flammability | | X |
| Ignition point | X | X |
| Burning temperature | X | X |
| Burning speed | | X |
| Thermal value | | X |
| Lower flammable limit | X | X |
| Upper flammable limit | X | X |
| Flammable range | X | X |
| Inerting | X | X |
| Static electricity | X | X |
| Flash point | X | X |
| Auto-ignition | X | X |
| Spread of fire: | | |
| By radiation | X | X |
| By convection | X | X |
| By conduction | X | X |
| Reactivity | X | X |
| Fire classifications and applicable extinguishing agents | X | X |
| Main causes of fires: | | |
| Oil leakage | X | X |
| Smoking | X | X |
| Overheating pumps | X | X |
| Galley appliances | | X |
| Spontaneous ignition | X | X |
| Hot work | X | X |
| Electrical apparatus | | X |
| Reaction, self-heating, and auto-ignition | | X |
| Fire prevention: | | |
| General | X | X |
| Fire hazards of DL and LG | X | |
| Fire detection: | | |
| Fire- and smoke-detection systems | | X |
| Automatic fire alarms | | X |
| Firefighting equipment: | | |
| Fire mains, hydrants | | X |
| International shore-connection | | X |
| Smothering-installations, carbon dioxide ($CO_2$), foam... | | X |
| Halogenated hydrocarbons | | X |
| Pressure-water spray system in special-category spaces | | X |
| Automatic sprinkler system | | X |
| Emergency fire pump, emergency generator | | X |
| Chemical-powder applicants | | X |
| General outline of required and mobile apparatus | | X |
| Fireman's outfit, personal equipment | | X |
| Breathing apparatus | | X |

TABLE 13.121(g)—Continued

| Course topics | 1 | 2 |
|---|---|---|
| Resuscitation apparatus | | X |
| Smoke helmet or mask | | X |
| Fireproof life-line and harness | | X |
| Fire hose, nozzles, connections, and fire axes | | X |
| Fire blankets | | X |
| Portable fire extinguishers | X | X |
| Limitations of portable and semiportable extinguishers | X | |
| Emergency procedures: | | |
| Arrangements: | | |
| Escape routes | X | X |
| Means of gas-freeing tanks | X | X |
| Class A, B, and C divisions | | X |
| Inert-gas system | | X |
| Ship firefighting organization: | | |
| General alarms | | X |
| Fire-control plans, muster stations, and duties | | X |
| Communications | | X |
| Periodic shipboard drills | | X |
| Patrol system | | X |
| Basic firefighting techniques: | | |
| Sounding alarm | X | X |
| Locating and isolating fires | X | X |
| Stopping leakage of cargo | X | |
| Jettisoning | | X |
| Inhibiting | | X |
| Cooling | | X |
| Smothering | | X |
| Sizing up situation | X | |
| Locating information on cargo | X | |
| Extinguishing | | X |
| Extinguishing with portable units | X | |
| Setting reflash watch | X | X |
| Using additional personnel | X | |
| Firefighting extinguishing-agents: | | |
| Water (solid jet, spray, fog, and flooding) | | X |
| Foam (high, medium and low expansion) | | X |
| Carbon dioxide ($CO_2$) | X | X |
| Halon | | X |
| Aqueous-film-forming foam (AFFF) | | X |
| Dry chemicals | X | X |
| Use of extinguisher on: | | |
| Flammable and combustible liquids | X | |
| Manifold-flange fire | X | |
| Drip-pan fire | X | |
| Pump fire | X | |
| Drills for typical fires on barges | X | |
| Field exercises: | | |
| Extinguish small fires using portable extinguishers: | | |
| Electrical | X | X |
| Manifold-flange | X | X |
| Drip-pan | X | X |
| Pump | X | X |
| Use self-contained breathing apparatus | | X |
| Extinguish extensive fires with water | | X |
| Extinguish fires with foam, or chemical | | X |
| Fight fire in smoke-filled enclosed space wearing SCBA | | X |
| Extinguish fire with water fog in an enclosed space with heavy smoke | | X |
| Extinguish oil fire with fog applicator and spray nozzles, dry-chemical, or foam applicators | | X |
| Effect a rescue in a smoke-filled space while wearing breathing apparatus | | X |

(1) Course in tank-barge firefighting.
(2) From the basic firefighting section of the IMO's Resolution A.437 (XI), ''Training of Crews in Fire Fighting''.

### § 13.123 Recency of service or experience for original tankerman endorsement.

An applicant for an original tankerman endorsement in subpart B, C, D, or E of this part shall have obtained at least 25% of the qualifying service and, if the endorsement requires transfers, at least two of the qualifying transfers, within five years of the date of application.